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BETTER FRUIT

VOLUME XV

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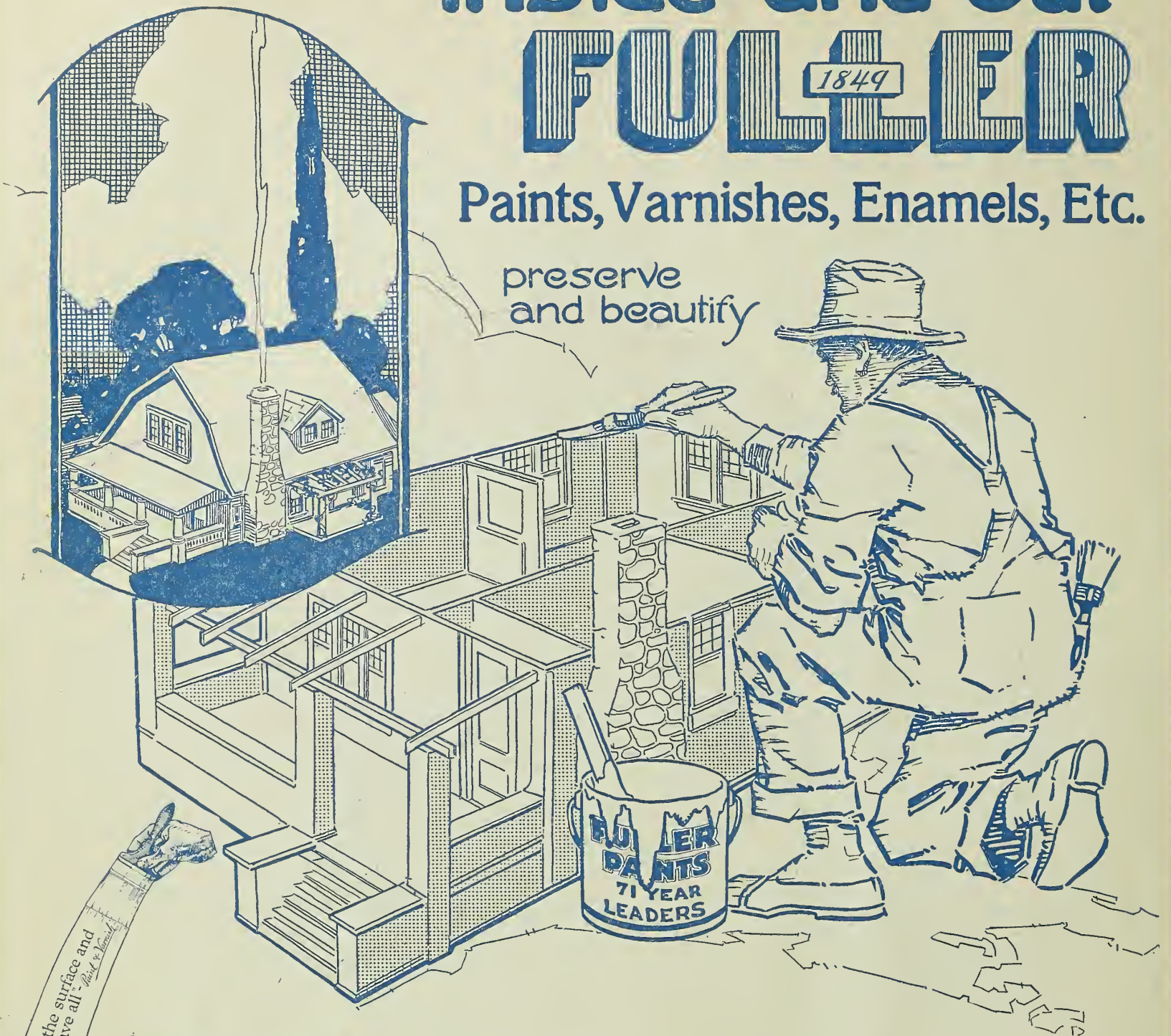
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VOLUME XV

PORTLAND, OREGON, NOVEMBER, 1920

NUMBER 5

Codling Moth Control in British Columbia

By R. C. Treherne, Entomologist in Charge for B. C. Dominion Department of Agriculture, and
H. H. Evans, District Field Inspector, Provincial Department of Agriculture

THE great object that Department of Agriculture officials, both Federal and Provincial, in British Columbia have always carried before them in handling the codling moth situation is the eradication of incipient outbreaks. In a broad aspect the work may be divided into two channels. (1) The control, by eradication methods, of incipient centers of infestation. (2) The prevention of the importation of the moth by infested railway fruit cars. The life history studies of the moth may also be considered a third aspect of the work confronting those engaged in the control operations in British Columbia, but inasmuch as this work is undertaken only to a point where the information gathered would assist in the control operations, this phase may be considered only as an accessory motive to the eradication procedures. Fortunately, in British Columbia, while several of the so-called "incipient" outbreaks have been prolonged over a period of from six to ten years, we still consider that the moth is not an established pest. Certainly it is a fact that the codling moth is not yet a matter of concern to the fruit growers as a whole on their individual holdings. The basis for this satisfactory state of affairs was established several years ago by former officials of the Department of Agriculture who realized the hold this moth was capable of obtaining in apple and pear raising districts and who instituted measures to prevent its spread. The present executives now engaged in the control operations can only be said to have continued the work previously laid down, and to have perfected the system by educational and field operations. We do not, for a moment, wish the idea to go abroad that British Columbia has devised any new or startling method of control. We have merely realized the serious loss this insect is capable of causing, drawing our opinions from observations gathered from apple raising sections of the United States and Eastern Canada, and having a full realization of the possibilities, have adopted measures before the insect had a chance to become established. We are under a great debt of gratitude to our friends in the Northwestern United States who have freely

supplied us with information on this insect, particularly as regards losses occasioned in the orchard and life history records. Our life history notes, in British Columbia, are by no means perfect owing to the paucity of material available for study and to the dangers of breeding the moth in areas which are either not infested or where eradication measures are in operation. In return for the information that we have obtained by direct and indirect means from the Northwestern United States we are very willing to supply any entomologist, field inspector or orchard section with information gathered from our work, both as regards modes of operation and costs, in the belief that while infestations of long standing are difficult to handle, young orchard sections may find the information of great value.

Outbreaks of Codling Moth. Fourteen distinct and separate outbreaks have occurred in British Columbia since 1905. Today only one serious center of infestation is known to be present and that occurs in the interior sections of the province. Larvae have been taken and occur, at this time, at one or two coastal points, but their presence does not occasion much worry, inasmuch as the humidity and temperature records are not suitable for a rapid multiplication of the insect. Our greatest concern is the dry interior, where temperature conditions are eminently suited to a rapid and productive multiplication of the insect, but, as we have said, only one center of infestation now occurs in this section. As may be supposed, conditions best suited to the moth are also best suited for tree fruit production for it is in the dry sections of the interior that our best tree fruit sections are located. Approximately 40,000 codling moth larvae have been destroyed in British Columbia since 1908, the great majority being taken in the Okanagan Valley. The greatest number taken in the Okanagan Valley in a single year totalled nearly 10,000 (1915). This number has been reduced to such an extent by vigorous eradication measures that in 1919, last year, only 337 larvae were taken, and of this number we feel morally certain that 150 resulted from a new migration

from infested railway cars during the year. During 1920 until the close of September only 40 larvae have been taken in the infested area in the Okanagan Valley.

We are, therefore, able to state that the codling moth may be eradicated, given the proper measures, and the full co-operation of the growers.

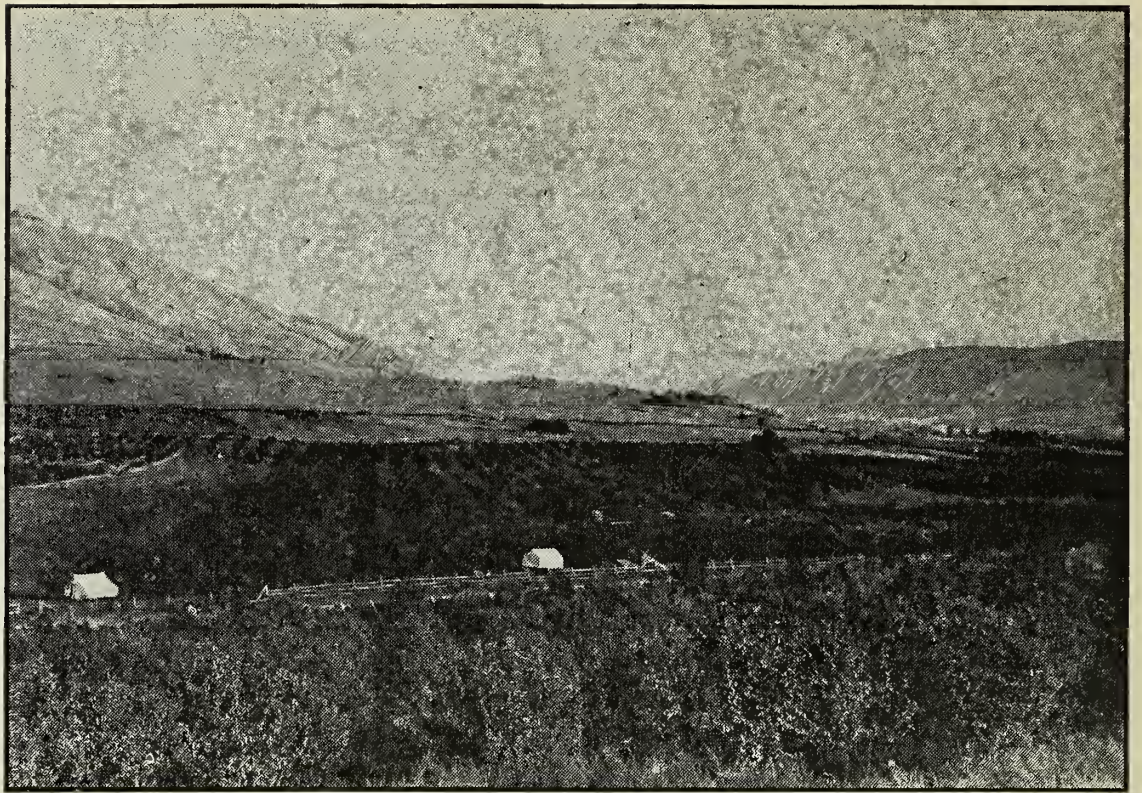
Life History Records. As stated before, life history records have been kept simply to ascertain the correct dates for spraying. We do not claim to have obtained a full and complete statement of the bionomics of the moth. Such records as we do possess are limited by the extra careful and to some extent unnatural methods of breeding.

In general, it may be stated that two complete broods usually occur, although our laboratory records do show that a single generation is not uncommon.

1916. The winter of 1915-16 was an exceptionally severe one and all codling moth larvae wintering above snowline were killed. It was observed that with smooth bark young apple trees the majority of the larvae spun up at ground level or in the soil nearby. The survivals from the winter arose from these larvae. In old trees with corrugated bark the mortality was very high. (Note — This indicates that in young orchard sections the value of the control operations by banding and band examinations is somewhat curtailed and made more difficult.) The spring opened favorably but was cool, and the blossoming period of apples took place from the first to the middle of May, and calyx spraying operations occurred from the middle to the end of that month. Codling moth adults were flying during the first two weeks of June until late in July, and full grown larvae were taken on July 11. Larvae commenced to leave the fruit about July 18. Adults bred from pupae collected in the field commenced flying on August 1, although a slight emergence took place on July 25. This was the start of the second generation, with larvae of this generation present from mid-August until Autumn. Out of 116 larvae, whose histories were correctly recorded this year, 73 per cent were

single brooded. Second generation eggs were being deposited in the field from August 1 up to September. Moths continued to emerge under insectary conditions until October 4. With the limiting factor of the effectiveness of the calyx spray for controlling "calyx entry worms" field records showed that 80 per cent of the spring generation of larvae entered through the side of the apple, 8 per cent calyx and 12 per cent stem entry.

1917. The winter of 1916-17 was colder than normal, and again we find a heavy mortality due to low temperatures, winter mortality being registered as 84 per cent. Larval material collected in the autumn of 1916 was carried over the winter in burlap bands around a tree, two feet from the ground level and in ground cages. Some larvae were carried over winter in glass cylinders, which were open at each end and plugged with cotton wool and also in folds of corrugated cardboard. The only larvae that survived the winter, reaching the adult state, in due course were those that were held in ground-level cages. In one locality some of these cages became flooded early in April by melting snow and remained immersed in water for the best part of three weeks, and the larvae contained in them survived, while others, which were subject to the varying spring temperatures above ground succumbed. At the time this note was taken it was remarked that flooding orchards in the early spring would be favorable to the development of the larvae. The mortality of over-wintering larvae has been noted by many writers on the codling moth and notes have been taken showing that the range may vary from 5 per cent to 81 per cent, according to the locality and the year. In 1917 over-wintering larvae commenced to form pupae on May 24 and continued until well into June. The spring generation of moths started to emerge on June 20 and continued emerging during July. The season was backward and calyx spraying was in progress between June 1 and 13, just following the blossoming period of apples. Eggs, from our observations, were laid between June 29 and July 3, incubation lasting from ten to seventeen days. The first generation larvae that were observed in the field were found on June 29, and they became full grown on July 15. Pupation of the first generation commenced in the field about July 21. Every larvae (94) under observation this year formed pupa and appeared later as a moth. Hence no records are available to show that any portion of the generation was single brooded, although it may be stated with a fair degree of certainty that practically all were double brooded this year. Second generation larvae were in evidence in the fruit on August 10, having commenced to appear around the first of the month. The remarkable differences in this year's records are worth noting. The spring opened late, producing a delayed flight of moths, but the early summer was very warm and



View of Orchard Section in the Okanagan Valley near Vernon B. C.

dry so that conditions were more than equalized.

1918. The blossoming period of apples in the Vernon section occurred during the closing days of April this year and calyx spraying was in progress on May 10. The number of over-wintering larvae this year, which were held under observation, was very few; the mortality, however, due to winter, was less than that which occurred in 1917 or 1916. Owing to the transfer of our insectary this year some material was interfered with to such an extent that a very imperfect statement can be made as to the actual mortality due to winter. It was judged, however, to be less than 40 per cent. The first spring brood of moths appeared under insectary conditions during the first two weeks of June, but doubtless moths were flying in the field during May and until July, judging from the size of the larvae taken in the fruit in the quarantined orchards. Here again, as in 1917, the great majority of the larvae of the first brood preserved to form the second generation, and moths of the latter generation, were freely appearing from July 24 onward.

1919. The blossoming period of apples was late this year and the first calyx sprays were being applied between May 27 and June 7. Moths of the spring generation were flying late in June and full grown larvae were present and leaving the fruit on July 22. The percentage of the larvae, from cage specimens, that proved to be single brooded this year, was about 20 per cent. Of the remainder, moths appeared on August 7 and continued emerging until late in September. Minute second generation larvae were present in the field in fruit on August 10.

1920. During this present year the spring moth emergence continued from June 3 to 30. The blossoming period of apples took place between May 10 and June 1, and calyx spraying opera-

tions were in order between May 28 and June 13. First cover spray, June 26 to July 6. Second cover spray, August 6 to 20.

Summary of Life History With Spray Dates—1916.

Apple blossoming date, May 1-15.
Calyx spray date, May 15-30.
Flight spring moths, June 7-July 30.
Larvae full grown (1st brood) July 18.
Flight summer moths, August 1.
Second brood larvae entering apples, August 15.

1917.

Apple blossoming date, May 10-30.
Calyx spray date, June 1-13.
Flight spring moths, June 20-July 15.
Larvae full grown (1st brood) July 15.
Flight summer moths, July 25.
Second brood larvae entering apples, August 1.
Cover spray date, June 28-July 9.
Third spray date, August 3-13.

Band examinations—

- (1) July 19-30.
- (2) August 2-19.
- (3) August 28-September 12.
- (4) September 17-22.
- (5) September 24-29.
- (6) October 5-9.
- (7) October 10-15.
- (8) November 10-22.

1918.

Apple blossoming date, April 29-May 7.
Calyx spray date, May 10-25.
Flight spring moths, May 25-July 1.
Larvae full grown (1st brood) July 15.
Flight summer moths, July 24-August 8.

Second brood larvae entering apples, August 1.

Cover spray dates, June 23-29.

Band examinations—

- (1) July 2-15.
- (2) July 17-30.
- (3) August 5-12.
- (4) August 18-September 4.
- (5) September 27-October 3.
- (6) November 6-20.

1919.

Apple blossoming date, May 9-25.

Calyx spray date, May 27-June 7.

Flight spring moths, June 25.

Larvae full grown (1st brood) July 22.

Flight summer moths, August 7-September 15.

Second brood larvae entering apples, August 10.

Cover spray dates, June 30-July 11.

Third spray date, August 19-26.

Band examinations—

(1) July 4-9.

(2) July 30-August 9.

(3) August 11-20.

(4) August 25 to September 15.

(5) September 20 to October 6.

(6) October 27 to November 17.

Orchard Operations in Infested Areas.

Just as soon as the presence of larvae of the codling moth is realized in any given orchard section, all trees are at once banded. Usually records of new infested areas become known in the autumn or late summer. All that remains to be done, therefore, in the autumn of the year is to examine the burlap bands and to closely supervise the picking and packing operations. The following spring a quarantine area is established and the following procedure is undergone:

(1) All trees are banded.

(2) Periodical inspections are given the bands and main tree trunks commencing in April for over-wintering larvae, and from early June onward, as many times as possible, but at least six times before November 15.

(3) Windfalls from July onward are destroyed when possible.

(4) Two or three spray applications commencing with the calyx spray are given. (Calyx, first cover, June 25-July 5; second cover, August 1-10.)

(5) All root sucker growth, loose bark and dead wood is removed.

(6) Old neglected trees are pruned back to accommodate the spraying operations.

(7) Under certain conditions all fruit is removed from the trees before the end of June, but the trees are sprayed and banded in the usual manner.

Fruit Disposal in Infested Area. The present method of handling an area infested with codling moth is somewhat as follows:

(1) A quarantine area is formed with an allowance made for treatment of a contiguous area not necessarily infested.

(2) All apple and pear fruit is closely inspected before shipment, and inspectors are notified when shipments are intended.

(3) All fruit is packed in the infested area, no fruit being allowed to be handled in a packing house through which fruit from a non-infested area is passed.

(4) All orchard boxes used in quarantine area must remain in such area unless passed by an inspector.

(5) All fruit in infested areas is loaded into railway cars by the most direct route, and no such fruit is al-

lowed to be sold in the Province or for export from Canada.

(6) Loose or unpacked fruit must not be removed from a quarantined area without permission, and no fruit may be stored in cellars or houses without proper inspection.

(7) Cull fruits must be at once made use of or be destroyed.

Division of Labor. In the years gone by and at present all areas in the Province of British Columbia infested with the codling moth have been and are still under Government control. The necessary operations are undertaken according to the foregoing policies. In consequence of which the Provincial Department of Agriculture stands responsible for part of the cost. In broad outline the Federal Entomological Branch reviews the life history and the Provincial Horticultural Department handles the field control in co-operation with the growers affected.

The plan that has been effected is as follows:

The Provincial Department supplies the bands, applies and inspects them providing the necessary labor and appliances for the same; the necessary number of power spraying machines, with gasoline, oil and repairs; an engineer nozzleman with each spraying outfit, and supplies of arsenate of lead; the labor necessary for the removal of sucker growth, dead bark and superfluous wood within certain limits, and for the removal of fruit from the trees when such procedure is deemed necessary. The Department also stands responsible for the inspection of all fruit within the quarantine area and for the supervision of the railway fruit cars entering orchard districts. The growers supply the necessary teams of horses for the transportation of the spraying machines through the orchards and from one orchard to another; the requisite drivers and extra nozzlemen. They also pick and pack their own fruit and purchase the spraying materials, which are laid down by the Department.

The Cost Per Acre.

Three-year period—1917-18-19.

	To	To
	Dept.	Grower
Banding material	\$.38	.....
Labor, bands, inspection..	2.39	.....
Repairs, gasoline, oil, etc..	1.95	.....
Engineer labor	1.90	.....
Arsenate of lead .....	.....	\$ 1.52
Team, labor for spraying..	.....	5.23
Fruit inspection	2.25	.....
Inspector's salary, 6 mo...	4.47	.....

Cost per acre	\$13.34	\$ 6.75
Average cost per tree ....	.25	.13
Average number trees per acre,	52.	

Railway Fruit Cars. In the belief that railroad fruit cars are the principal method of introducing the codling moth into new sections, very careful consideration has been given the method of handling such cars.

The various outbreaks that have occurred in the Province so far have, in the main, been traced to imported fruit cars, which have carried infested fruit at some time during the season and

which are sent into British Columbia empty to receive shipments of local fruits.

Arrangements are made with the agents of the railway companies whereby inspectors are notified when empty railway cars arrive. Immediate inspection is at once made and only certified clean cars are allowed to continue on their way to other orchard sections. Infested cars are iced at once, kept closed and loaded with local fruit, the cars being carefully cleaned and the sweepings burnt. The cost of railway car inspection approximates 50 cents per car.

Steps are being taken now to introduce a system of car disinfection by steam, and preliminary experiments have already been carried on with excellent results, but thus far the scheme has not been put into general practice. As a result of the work of codling moth control in British Columbia we are able to claim that the insect can be eradicated from any given seat of infestation. The most important problem that confronts us, however, is the treatment of cars to prevent reinfestation. We appeal to our friends in the Western United States to do all in their power to maintain a state of car cleanliness for their own good as well as for ours. It should pay handsomely, and with proper control on importations, established centers of infestation may be reasonably handled by departments in co-operation with the growers. This last point cannot be too strongly emphasized—co-operation with the growers. We contend that no reform movement or legislative act is of any avail unless public opinion supports it. We are fortunate, in British Columbia, in that our growers are thoroughly alive to the serious import of the codling moth, and what success we, as Department officials, have had in codling moth eradication is as much due to the hearty co-operation of our local orchardists as to other factors. We cannot bespeak too strongly the importance of this aspect of the problem, and we would leave you with the suggestion that the first and most important phase of the codling moth eradication is the growers' co-operative movement. After that, procedures are comparatively simple.

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Sites and Soils for Small Fruits in the Northwest

By C. I. Lewis

IN CHOOSING the location for a small fruits plantation one has to take many points into consideration. First, there are certain climatic conditions which will determine to a large degree whether certain of our small fruits can be grown to advantage. The rainfall or the possibilities of having an abundance of irrigation water are very important factors. With some of our small fruits the rainfall plays a role which probably even irrigation cannot supplement in all cases owing to the fact that in regions of considerable rainfall the moisture content of the atmosphere at times is apt to be greater than in some of the arid belts. With certain of the cane fruits and brambles it has been demonstrated that they grow to the greatest degree of success on a rich soil abundantly supplied with humus and moisture and an atmosphere which is not too dry.

The winter temperature will, in some cases, be a determinate. Especially is this true where one is attempting to grow the evergreen types like the Evergreen blackberry, Loganberry, Phenomenal, etc. Summer heat also has an influence, at times producing a condition which is unsatisfactory to certain forms but being of distinct advantage to others. The fall temperature, that is, the suddenness with which the growing season terminates, is to be considered where certain more tender forms are grown. The length of the growing season and the altitude also play a very important part. The soil has an important role, especially since some of our cane fruits depend so much upon a cool, moist condition of the soil. Most of our small fruits demand very good drainage. It is evident, then, that soils of this type must be chosen, and in most cases the richer the soil the better.

The response of a plant to natural conditions is shown by an example that we can give of the Evergreen blackberry. Where it is grown wild in Western Washington and Western Oregon, the berries are small, hard and sour, but where it is grown wild in our coast and mountain regions, it is very luscious and hardly seems like the same fruit. It is only by bringing about good conditions, by following good tillage, pruning and feeding that one can produce the Evergreen blackberry to the highest degree of perfection.

In addition to the natural surroundings, I want you to also take into account the possibilities of shipping, and at times the possibilities of using the fruits in the form of by-products. Here on the Pacific Coast we have a tremendous range of climatic conditions, elevations from sea level to the limit of plant growth. We have rainfalls that sometimes range from over one hundred inches to a few inches. Our soils vary from the heaviest of adobe to the lightest of sand, silt, ash and pumice stone. There is such a tremendous range of climate and soil conditions that the problem of small fruit culture

in any one region becomes largely a local one, and in many cases must be solved by local experiments, but after all these tremendous ranges of climatic conditions are of wonderful assistance to us in that they extend our range of crop production and make it possible to grow more types and varieties than would otherwise be possible.

I will mention first some points in the Northwest which we will divide into areas, largely according to climatic conditions. First comes the Western Coast region of Oregon, Washington and British Columbia. This includes the famous Puyallup Valley of Western Washington, in which the Evergreen blackberry and raspberry are grown to the highest degree of perfection. The islands in the Sound, the lower mainland of British Columbia and such counties in Western Oregon as Clatsop, Tillamook, Lincoln and Coos are all included in this class. This region is subject to a fairly heavy rainfall, has a long growing season and quite a range of soils, although the predominant soils are clay loams. In this region the brambles, Loganberries, Raspberries and Blackberries grow to a wonderful degree of perfection. There is probably no section in the United States where such fruits will yield more heavily or grow more vigorously and rank than in this section named. The climatic conditions are such that a tremendous area of these fruits should be planted. Canning factories, evaporators and similar plants should be established in many quarters, while those that are advantageously located as far as shipping points are concerned should ship out large quantities of fruit.

The bench lands of this region produce very good strawberries, and the strawberry under these conditions tends to bear for a longer season, bearing two or three crops. I have picked them abundantly as late as the middle of September. The clay loams, and even some of the tide lands, seem to grow Loganberries and blackberries very nicely. The sandy and silt loams are splendidly adapted to raspberries. Red raspberries, under such conditions, grow very vigorously. I have seen canes ten feet long that have borne fruit to the very ends of the canes and the yields are unusually high. Reports of yields as high as 500 and 600 crates per acre of red raspberries have come from the Puyallup district.

Between the Coast Range and the Cascades there are a number of valleys, especially in Western Oregon, such as the Rogue, Umpqua, and Willamette. The famous Bear Creek bottoms of the Rogue River are ideal for dewberries, raspberries, loganberries, etc. In fact, any class of small fruit thrives well along the river and its tributaries, and a much greater industry should be built up than now exists. Strawberries, of course, can be grown all over the Northwest. In the Umpqua Valley all classes of small fruits succeed. The

region is becoming famous for its very early strawberries, being one of the very earliest regions in the entire Pacific Northwest. The low altitude and the shelter obtained from the mountains result in early maturing. This section should devote more time and energy to early produce of all kinds. In the Willamette Valley certain large sections are developing small fruits. In the Newberg district, on the red hill soils, raspberries, strawberries, blackcaps and loganberries are all thriving. There is a tremendous area of land in the Willamette Valley adapted to small fruits. The sandy and silt soils of the river bottom lands, such as the Mission bottoms at Salem, will produce small fruits of all classes. The yields are very high. At Russellville and vicinity quite a small fruit development has taken place, and in the sandy loams of that region the raspberry thrives especially well. Then we have the inland mountain regions, like Hood River and White Salmon, that have become famous for their strawberries, and while many other small fruits could be successfully grown, the reason they are not grown is that the growers have not attempted to grow them. The strawberry has been the pioneer crop and has been grown until the orchards come into bearing.

In the inland valleys of the Inland Empire small fruit culture at times becomes very profitable. Such regions as Kennewick are early and the stony soils of the Walla Walla Valley are extremely early. They warm up very rapidly in the spring. All along the Columbia River fine strawberry lands can be obtained. In the Payette Valley of Idaho one finds the blackcap being grown successfully under irrigation. There is not a valley in all that wonderful territory but what can grow some form of small fruit to the highest degree of perfection. Gooseberries and currants will be the least successful owing to the fact that both these crops like cool weather and a cool, moist soil. Where dry soils are found and combined with rather dry weather conditions it will be advisable to plant the gooseberry and currant in close proximity to a building, generally on the north side, or, if this is impossible, you could plant them among the fruit trees, where they get some coolness and shade from the trees.

The strawberry has the widest range of adaptability of any fruit we are growing in America. It is being grown from Alaska to Southern California and from Maine to Florida. While it is true that in some of these regions it is necessary to ship the plants in, it being impossible to produce the young plants that will fruit successfully in the region, nevertheless a profitable business is carried on in all these states. In the Pacific Northwest, as far as the strawberry is concerned, it becomes very largely a local problem. There are

Continued on page 17.

The Orchard Leaf Roller—How to Control It

By A. L. Melander, Entomologist State College, Pullman, Washington

WITHOUT attempting to decide whether the chicken or the egg came first, we may say that the leaf roller begins its life cycle in the egg stage during the summer. The eggs are glued in flat masses on the bark of the branches, twigs or trunk, at first, greenish, almost bark-colored, but becoming whitish after hatching. The masses vary in size from an eighth to a quarter inch in diameter and contain

the vital parts of the flowers. This causes the flowers to drop so badly that an infested tree will set no fruit even though it might blossom heavily.

From then until after midsummer the worms can be found, skeletonizing the

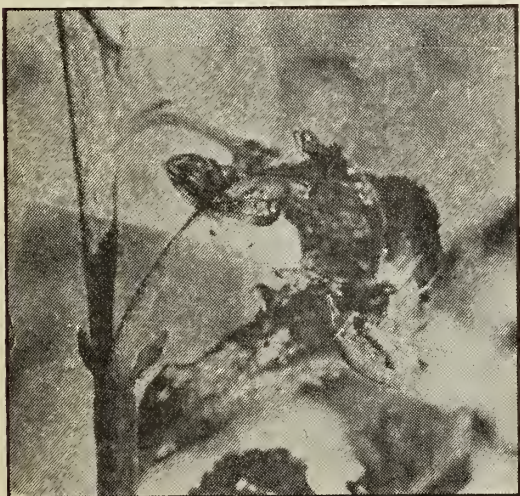
leaves, rolling up a leaf here and there, and where abundant completely defoliating the trees. The green worms are very sensitive and when touched wriggle rapidly out of the way or spin their way to the ground on a thread of silk. The pupa is practically naked and placed in the leaf-nests. Moths appear after midsummer, hiding during the day among the trees, but flying actively at



How the Leaf Roller Works.
This insect has gained its name by its habit of curling the leaves.

an average of about forty or fifty eggs. The eggs may remain on the bark for a couple of years, the old ones being recognizable by their color, and by being perforated with the exit-holes where the hatching worms emerge. It is in the egg condition that the leaf roller spends the winter.

When the trees are well in leaf the following spring hatching begins. The worms are at first very small, a sixteenth of an inch long, greenish in color and with a black head. At the time apples blossoms are opening the worms move into the blossoms, usually one to each blossom, and proceed to nibble at



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dusk. The moths are scarcely a half-inch in length and vary in color from almost a sulphur yellow to yellow with brown mottlings. The moths do not lay eggs at once but probably require ten days before reaching maturity. Eggs are deposited on any of the orchard trees, on willows, cottonwoods, roses and probably on any shrub near by.

The leaf roller caterpillars have proved to be remarkably resistant to arsenical sprays. Ordinary arsenate of lead, as applied against the codling worm, has no appreciable effect on them. Spokane Valley fruit growers have been spraying Paris green at the rate of six pounds to the hundred gal-

lons, and have found it partially though not completely effective. This strength of Paris green is the equivalent of using eighteen pounds of arsenate of lead powder to the 300-gallon tank, an amount prohibitive in cost, and in the case of the Paris green so caustic as to irritate the men and horses, making it impossible to retain men on the work. Fumigation is likewise too costly and its effects unknown.

Experiments and orchard practice have demonstrated that the use of a dependable oil spray applied at the end of the winter is the most satisfactory method of controlling this pest. For this purpose a good miscible oil spray

having a heavy body should be used at about 7 or 8 per cent strength. The trees should be completely wetted and not merely sprayed, and the application should be made in good spraying weather. If the spray is too weak, if the application is scant, if wet weather immediately precedes or follows the spraying, effective control cannot be expected. It is not advisable to apply oil sprays until all danger of excessive cold weather is passed. The proper use of oil sprays when the buds are swelling has not been attended by harm to the trees, but the misuse of too strong sprays, or improperly emulsified oil might occasion a set-back. Miscible oil sprays have even been used after trees are coming into leaf, causing a little spray-burning of the foliage, but this injury has been quickly outgrown.

The orchard leaf roller is not a new pest. It has been long known over a wide range, and in Washington I have seen it over a dozen years ago from the Spokane region. The past few years, however, the pest has multiplied to an alarming extent, until now it is decidedly the worst problem many fruit growers are facing. The orchards from Spokane east to the state line are apparently the heaviest infested and scarcely an orchard in the Opportunity-Greenacres-Otis district is free from the moth. Many have lost their crops and even the foliage this year. This insect occurs about Kettle Falls, through much of Spokane County besides Spokane Valley, and also has obtained an alarming foothold near Walla Walla.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of the Better Fruit, published monthly at Portland, Oregon, for October 1, 1920.

State of Oregon, County of Multnomah—Before me, a notary public in and for the state and county aforesaid, personally appeared D. L. Carpenter, who, having been duly sworn according to law, deposes and says that he is the business manager of Better Fruit, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, embodied in section 443, postal laws and regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:
Publisher, Better Fruit Publishing Co., Inc., 800 Oregonian Building, Portland, Oregon.
Editor, E. E. Faville, 800 Oregonian Building, Portland, Oregon.

Managing editor, none.
Business manager, D. L. Carpenter, 800 Oregonian Building, Portland, Oregon.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

Owner, Better Fruit Publishing Co., Inc., Portland, Oregon.

Stockholders, D. L. Carpenter, 800 Oregonian Building, Portland, Oregon.

E. E. Faville, 800 Oregonian Building, Portland, Oregon.
A. W. Stypes, 800 Oregonian Building, Portland, Oregon.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner, and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

D. L. CARPENTER,
Business Manager.

Sworn to and subscribed before me this 27th day of September, 1920.

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(My commission expires September 21, 1921.)



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Late Developments in Arsenical Insecticides

By R. A. Cooley, Bozeman, Montana

THE old classification of insect pests into those with biting and with sucking mouth parts and the corresponding division of insecticides into stomach poisons and contact poisons are familiar to horticulturists. It is rather generally realized, I believe, that practically all of the stomach poisons used are different forms or compounds of arsenic. Probably nearly all of us remember back to the time when Paris green made its appearance in connection with the control of the Colorado potato beetle, and many will recall an earlier day when we used London purple on potatoes. Since those early days much progress has been made in our knowledge of arsenicals and a number of new poisons have been brought to our attention. I have thought that it would be profitable to discuss and compare the various arsenical insecticides and to mention the underlying principles which should govern the selection of a poison for any particular use, so as to get the best results and at the same time not use one that is more expensive than necessary.

I have made a table of the more important arsenical insecticides which compares them and gives much information in a condensed form.

There are certain qualities of arsenicals which we need to consider in making a selection. They are: (1) killing power, (2) solubility in water, (3) quality of sticking on the foliage, (4) settling in water, (5) cost.

The killing power of an arsenical insecticide is roughly parallel to the percentage content of actual oxide of arsenic as determined by chemical analysis. By referring to the table you may see the relative strength of the various old and recently discovered poisons, expressed as oxides of arsenic. The comparison of amounts of oxides in the insecticides is to be looked upon as only an approximate indication of the relative killing powers. In this connection it should be stated that the figures for arsenate of lead are for a dry preparation and not a paste. Arsenate of lead paste, which was commonly in use a few years ago, was composed of 50 per cent of water. In the wet paste, therefore, the percentage of arsenious oxide would be only 12½ and the number of pounds to be added to 100 gallons of water for a given purpose would be double as much with the paste as with the dry preparation. It follows, of course, that in order to correctly judge of the relative value of these insecticides it

	Arsenic Oxides	Cost* per lb.	Soluble Arsenic	Sticking Quality	Settling Quality	Texture
Paris green	50%	60c	3.5%	Poor	Rapid	Coarse
Arsenate of Lead.....	25%	34c	1.50%	Excellent	Slow	Fine
Arsenite of Zinc.....	40%	26c	.67%	Good	Slow	Fine
Arsenate of Calcium.....	42.5%	30c	1%	Good	Slow	Fine
Refined White Arsenic.....	97%	15c		Poor	Rapid	Coarse
Crude White Arsenic.....	80%	12c		Fair	Medium	Medium

*Wholesale prices in 100-pound lots f.o.b. factory.

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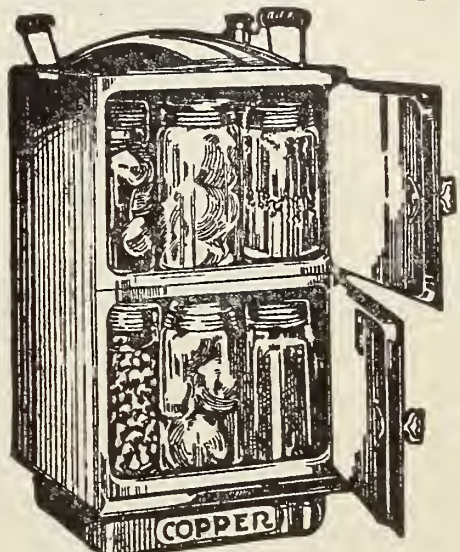
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is necessary to consider the relative cost of each.

The percentage of water soluble arsenic which a sample contains has been believed for many years to indicate the degree of injuriousness to the foliage of plants. Obviously only that arsenic which is brought into solution in the water used in spraying can be absorbed into the leaf substance and only that which is absorbed can injure the leaf. Therefore, in judging the quality of an arsenical insecticide it is always necessary to know the percentage of water soluble arsenic. Potato vines are not easily injured by arsenic and a much higher percentage of soluble arsenic is permissible in spraying them than in spraying delicate foliage like that of the peach. It follows then that a low water solubility such as is found in arsenate of lead is of no particular advantage in a poison for the potato

beetle, while it is an advantage in the spraying of fruit trees.

The next column in the table deals with the sticking quality, but we shall consider the column on texture at the same time. By texture it is intended to mean the degree of fineness of the powder. If examined under a low power microscope, a wide difference of fineness will be found in the various kinds of arsenicals. Paris green is coarse and the granules examined with a microscope appear like so many rocks on a plane surface. They are easily brushed off by showers of rain and the sticking quality naturally is poor. The same principle holds throughout and the more finely divided powder has a better sticking quality. A good sample of arsenate of lead is exceedingly fine. The precipitate is practically amorphous and when the water once dries out, leaving the poison on the foliage, it is not

easy to loosen it again. Foliage which has been sprayed in the spring may be found still white with the poison in the fall.

The settling quality is governed mainly by the texture of coarseness and by the specific gravity. It will be seen in the table that the settling quality very closely parallels the coarseness of the powder.

The cost per pound, as given in the table, is based on prices this spring and these prices are wholesale at the factory in 100 pound lots. It is noticeable that the prices of Paris green and arsenate of lead are high compared to the percentage of arsenic which they contain. This is especially true of arsenate of lead. With these facts before you it is possible to choose for yourself between these insecticides, but certain statements should be made regarding some of

Continued on page 16.

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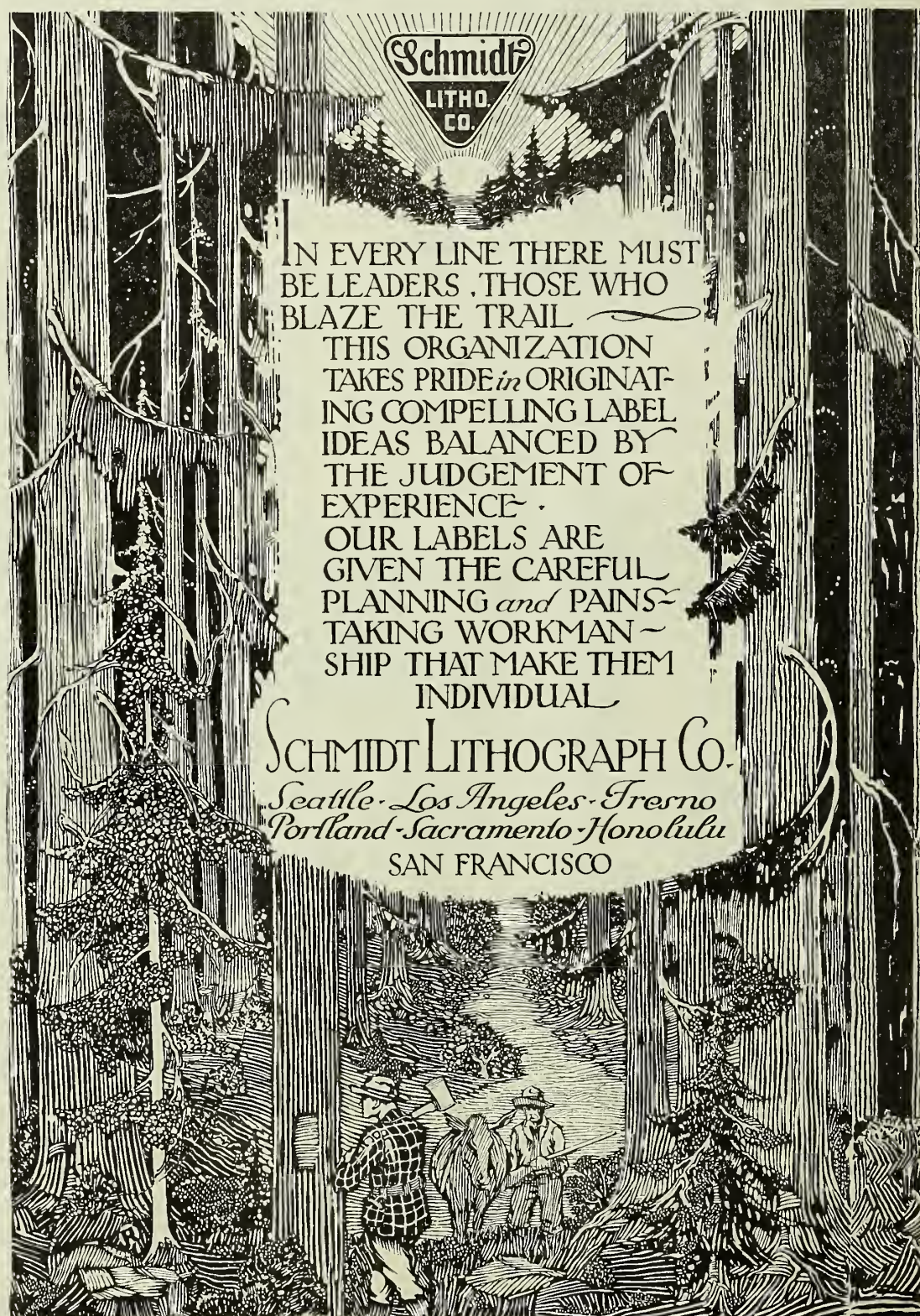
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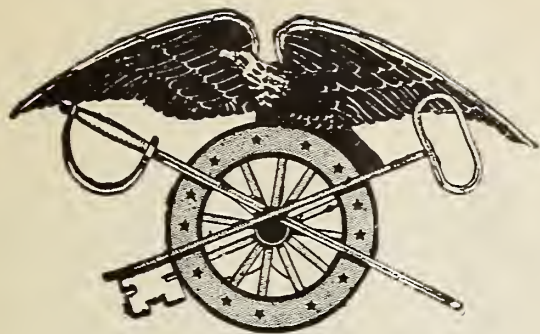
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BETTER FRUIT

An Illustrated Magazine Devoted to the Interests
of Modern Fruit Growing and Marketing.

Published Monthly

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703 Oregonian Building
PORTLAND, OREGON

Financing the Fruit Grower.

The additional financing of the Oregon prune crop made necessary by unfavorable weather and adverse marketing conditions by the bankers of Oregon is cause for widespread satisfaction upon the part of the fruitmen of that state, and, furthermore, is a signal tribute to the confidence that bankers have in the solidity of the methods of the Oregon Growers' Cooperative Association. It is also an acknowledgment from financial powers high up in the banking world that they are willing to stand behind the collective bargaining organizations of the fruitmen and farmers where they are organized on a sound basis. The loan advanced to the Oregon Growers' Cooperative Association for the purpose of carrying its members through an unforeseen and unpreventable critical period was no mere bagatelle, but the round sum of \$500,000.

As a result, the greater part of the immense prune industry of the state which is in the hands of the Oregon association is being carried safely along. Instead of having to wait for their money until the prunes are sold, growers are being advanced from two to five cents per pound when they are delivered at the warehouse of the association. This is being made possible by turning the warehouse receipts for the fruit over to the bankers as collateral.

Of course, an individual with a large tonnage and good security would probably be able to secure financial assistance for the same purpose, and then again he might not. The significance of the transaction, however, is in the fact that a big organization as a unit, with big resources and a trained marketing force, presents to the banker a security that the average fruit grower does not possess. It was this fact that the Portland clearing house of bankers took into consideration when they advanced this big loan and will take into consideration in future in financing the affairs of the Oregon Growers' Association or other large agricultural enterprises.

Advertising Will Do It.

The announcement of the Interstate Commerce Commission that the increase in freight rates on Northwest fruit must stand is a severe blow to the fruit growers of this section, for it means that this additional fixed charge must be taken care of by a lessened cost of production or a greater price for box apples.

Already Eastern growers, who are much nearer the big markets, are expressing their satisfaction over the decision. They admit the superiority of Western box fruit and believe the

higher price it must sell at will work much to their advantage.

However this may be, the fact still remains that the box package of apples—that is, such apples as are grown in the Northwest—is becoming more and more popular and is taking a firmer hold on the public. It remains, therefore, for the box apple grower to bring to the attention of the public on a much wider scale than ever before the merits of box fruit, and advertising will do it. With millions of consumers in this country and abroad who will not quibble over an additional quarter or half dollar for the finest quality of fruit in an attractive and easily handled package, advertising seems to present the most feasible plan of meeting the handicap of an extra marketing cost.

No Cause for Worry.

The fact that the apple crop of the country is not moving to market as rapidly as it did last year and in some other years we do not think is any cause for worry. The crop this year is not so large that it will swamp the markets of the world and a lessened demand now undoubtedly means a strong demand in the future.

In the Northwest, with its reduced crop and the building of many storage houses during the past year, growers are in better shape to await the later demand than ever before. According to government reports, growers and associations who do not believe they are being offered prices sufficiently high to justify them in selling their crops are placing their fruit in storage, and in fact statistics show a greater quantity of box apples in storage at this season of the year than ever before. The fruit, therefore, should be fed out to the market as it is needed at favorable prices.

With the inferior fruit produced abroad cleaned up, the export trade should show a decided picking up, while in this country the settlement of the election should have the effect of strengthening the demand for all commodities. We look, therefore, for a successful but not a bonanza year for the apple grower, notwithstanding some of the present handicaps.

An Adventure in Grafting.

J. M. Scroggs, two miles northeast of Colville, Washington, according to a report from Spokane, is a horticultural genius. He has forty-one varieties of fruit growing on one tree in his orchard. Starting with a Ben Davis apple tree about thirteen years ago, he began grafting different varieties of apples and pears on this tree. He says all the varieties are flourishing and that he has the earliest and the latest apples grown in Stevens County and all from this one tree. The apples are said to range in color from a brilliant yellow to a dark red and in taste from the sourest to the sweetest. The tree has been bearing fruit for seven years. The size of the fruit ranges from the size of a marble to 20 ounces in weight.

What the Papers Interested in Fruit Are Saying

The problem of the nurseryman is so complex that only men of courage and resource are willing to tackle it, no matter what the temptation of high prices. Indeed, this whole question of prices itself requires a lot of examination.

A rise of 1000 per cent in prices sounds fascinating, but if one begins too low the sum is not very great in the end. One thousand per cent on nothing, even when added to the original base number, is not very much. The simple fact is that prewar prices on nursery stock were too low. In many cases stock sold for less than the cost of production—less even than the prewar cost of production. A common price for apple trees was ten dollars a hundred. A fair price would have been eighteen to twenty dollars.

Now, with labor practically double in cost and often unobtainable at any price, with the cost of all other items more than doubled, the nurseryman cannot figure a profit on his trees unless he can see ahead of him a price of thirty-five to fifty dollars a hundred. The trees which he propagates this year, 1920, will be ready for market in 1923. Will the fruit growers by that time be ready to take them at those prices? Or will the wildcat growers of nursery trees be ready with their job lots of cheap stock to bid down the market again? Really, it is a question.

Speaking of the rising cost of materials for the nurseryman, let us notice the one important item of stocks. Practically all growers of apple trees buy their stocks, and these now cost anywhere round sixty to one hundred dollars a thousand, instead of six to seven dollars three years ago or three dollars and a half to four dollars ten years ago. That means a percentage of advance about equal to what the nurseryman is now passing on to the orchardist. The fact is that there is just as great a shortage of apple stocks relative to demand as there is of two-year-old apple trees. It is estimated that there is a total supply for the year of 7,000,000 apple seedlings, as against a normal turnover of 70,000,000. And nurserymen pay whatever is asked if only they can get the goods.

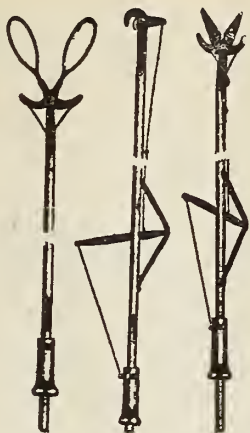
Thus it happens that some of them are actually paying ten cents apiece for seedling apple roots before propagation begins. That is as much as the full-grown two-year-old budded apple tree used to cost. Then if we figure a fifty per cent shrinkage between the seedling and the orchard stage, which is about a fair estimate, we discover that we have already invested twenty cents each in our trees for the planting of 1923, and we have not reckoned anything yet for the nurseryman and all his expenses.

In sober times before the military disturbance our American nurserymen bought the seedling apple stocks on which they bud or graft all our standard varieties from two sources. The domestic supply came largely from Topeka, Kansas, where in the deep, fertile alluvium of the Kansas bottoms the cleanest, straightest and strongest roots were developed. The foreign supply came chiefly from France, and mainly from a similar river-flood plain along the valley of the Loire about Angers. The French stocks cost more, but were generally considered to be better.

Well, when the war came the French nurseries were wrecked and that source of supply was diminished nearly to the vanishing point. That made little difference in 1918 and 1919, when nobody wanted to propagate apple trees anyway, but it makes a great difference in 1920, when everybody wants to resume operations on an enlarged scale. The Kansas growers of stocks likewise went numerous out of the business during the European hostilities, and even now they are slow to get back to the old trade. There are difficulties still back of them.

Take notice that to grow apple seedlings requires apple seeds, and the same circumstances which put out of business the nurseryman and the stock grower simultaneously floored the collector and purveyor of apple seeds. The American source of supply has been established chiefly in a few localized collectors in New Hampshire, Vermont and Northern New York. When the fruit growers stopped planting orchards the nurserymen stopped propagating trees and the stock growers stopped growing stocks and the seed collectors stopped washing out the apple pomace from the cider mills and went to cutting cordwood for the fuel market. So the chain was broken in every link.—*The Country Gentleman*.

Bastian Pruning Implements

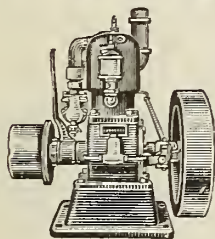


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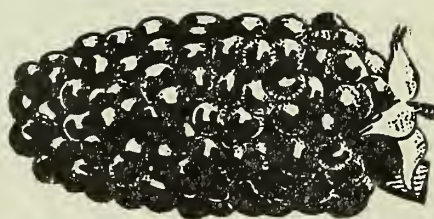
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"Genuineness and Quality"

Late Developments in Arsenical Insecticides

Continued from page 10.

them. Arsenite of zinc and arsenate of calcium are new and not well known. The dealers are not well informed about them, and if you were to obtain them you would probably have to deal directly with the manufacturers, though you should be able to get your dealer in town to put them into his stock. Arsenite of zinc has been on the market several years and we have experimented with it at the Experiment Station. It is noticeable that it contains a high percentage of arsenic compared to the cost, that it has a low water solubility, and a fine texture. If you wish to use it, I would

suggest that you begin on the potato and that you feel your way into its use in your orchards. I have used it at the Experiment Station on potatoes with excellent results for several years and do not hesitate to recommend it for the potato beetle. Arsenate of calcium is a newer product and we have found it very satisfactory as a remedy for the potato beetle. Its low cost particularly commends it, while it is very fine in texture.

I come now to white arsenic, which is produced in the Montana smelters in large amounts. When in 1917, in connection with the outbreak of grasshoppers in western Montana, we were in need of large amounts of poisons and could not get Paris green or arsenate of lead because of the unusual

conditions due to the war, we naturally thought of this supply of white arsenic in Anaconda and Great Falls. By a special arrangement I was able to get refined white arsenic, and we used it as a substitute for Paris green in the poison bran mash formula which is so universally used in the control of grasshoppers. The results, while not quite as good as with Paris green, were nevertheless satisfactory and we used large amounts of this poison in three or four counties in that year. We have found more recently, however, that the crude white arsenic just as it comes from the smelter is more satisfactory for our purpose because of its finer texture. The granules of the refined product are really quite coarse and because of this coarseness it is not possible to so thoroughly poison the particles of bran. We believe that the crude white arsenic in the poison bran mash formula, both for grasshoppers and for cutworms, has a bright future. Various other states are now using it and considerable has been written during the last year or two in the entomological journals.

I want to call your attention, also, to one more interesting thing about white arsenic. In certain work which we have been carrying on at the Experiment Station we have received some encouragement in the hope that white arsenic may be used in spraying potatoes. White arsenic is believed to be very soluble in water and one would think that it would be impossible to use it for spraying purposes. While we cannot fully explain the fact, we have found that we can spray potatoes with white arsenic, kill the potato beetles, and yet not injure the foliage at all. We have mixed it with water and sprayed the mixture at once upon the potato foliage and the failure to injure the leaves is perhaps explained in part by the short period of time that the arsenic was in the water, for when sprayed on the vines the water evaporated very quickly. We did not use any unusual haste in spraying. Our first experiment was with the refined white arsenic and later we used the crude product applied as a dust and our results were even better, due, we believe, to the fineness of the crude product. We expect to continue our experiments. Do not understand me as saying that I am recommending you to use either the refined or the crude white arsenic in spraying or dusting potatoes. On your own responsibility you may experiment as we have done, and I may say that under the climatic conditions which we have here in Montana there is some prospect that we may be able to save a considerable amount of money on arsenicals used in poisoning potatoes, and we probably are all aware that by far the greater part of the arsenical insecticides used in Montana is used on potato vines.

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If you were a tree,
After a big crop and long summer,
You would want a rest,
A rest from growth and insects.
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It will kill the various scale,—stop their damage,
Destroy the eggs of red spider (*Bryobia*) and aphids,
Which would later mean millions of insects, and
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Sites and Soils for Small Fruits

Continued from page 6.

practically very few soils but what the strawberry will succeed on. Those which are too dry or contain an excess of alkali or an accumulation of some injurious salt would not be desirable, but the average loam which has good air and soil drainage will produce some variety of strawberry, and one has the privilege of choosing from many hundred varieties. In the Inland Empire and in some of the mountainous valleys we find the Clark Seedling to be the leading berry, but in other sections the

Magoon, Sixteen-to-One, Senator Dunlap, Gold Dollar, Wilson and similar varieties are found to be most profitable. While it is true that strawberries can be grown in practically every region in the Northwest, certain regions, like Vancouver Island, parts of the Walla Walla, the Umpqua, Hood River, White Salmon and selected portions of the Willamette Valley, have become more noted, commercially, than other sections in the production of this berry.

The red raspberry thrives the best in the sandy and silt loams and in Western Oregon and Washington. Under the

climatic conditions that prevail they will respond to tremendous feedings of manure, especially where liquid manures can be applied the returns will be very gratifying. Our falls and winters are such that there is not the danger of winter-killing that one finds in the eastern part of the United States, when excess amounts of nitrogeous fertilizers are applied. The raspberry does not like cool soils or those which are poorly drained. Wherever it is possible to keep up a good moisture supply one should always choose the sandy or silt loams, not that the plants



The Complete Dormant Spray

—makes better quality fruit

IN almost every fruit section there are a few fruit-growers who produce better fruit and get a better price for it than their neighbors, and who also take the prizes at the fairs and fruit shows. Many of these skillful orchardists long ago selected Scalecide for their dormant spray—because Scalecide not only controls orchard pests controlled by other dormant sprays but does many things that no other spray or combination of sprays can do. Scalecide is becoming known even more for its invigorating effect on trees and its effectiveness in controlling other orchard troubles than for killing scale. Its invigorating effect is noted in increased

terminal growth; larger, darker foliage on bearing trees; and the holding of the foliage later in the Fall, thus accumulating starch and sugar which results in a plumper and stronger fruit spur. Scalecide kills insects, eggs and larvae of insects, and diseases that winter on the trunk or branches of the tree. It kills the hold-over cankers which cause fire blight, makes the old diseased bark peel off, and allows a new cambium to form. It kills the adults and controls Pear Psylla when applied in the Fall or on warm days in the Winter. (It is too late after their eggs are laid in the Spring). It kills aphids, too, when used as a delayed dormant spray.

Scalecide Requires Less Labor

One barrel of Scalecide, which makes 800 gallons of spray, will cover, until they drip, as many trees as three and a half barrels of lime-sulfur, which make 1600 gallons of spray. And of course you can apply 800 gallons of Scalecide with much less labor than 1600 gallons of lime-sulfur.

Scalecide Is Pleasant To Use

Scalecide is soothing, healing and antiseptic to skin of man or beast, whereas lime-sulfur is caustic and disagreeable. Scalecide does not injure even the eyes. It does not corrode the spray pump nor clog the nozzles, and being an oil, it makes the pump run easier and last longer.

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Every claim we make for Scalecide has been proved in our own large orchards, which now total 26,000 trees, and verified by growers throughout the U. S. We speak to you from 10 years' experience as fruit-growers, and our recommendations are based upon profitable orchard practice.

Avoid Disappointment — Order Scalecide Now

If there is a dealer in your section, ask him to reserve enough Scalecide for you. If there is no agent near you, write for our booklet, prices and guarantee, and give us the name of your dealer. Use the coupon below. Address Dept. 25.

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Gentlemen: Please send me prices, copy of Guarantee and free booklet on Scalecide, "Figuring the Cost of Spraying." I have.....

bearing trees;.....young trees. I have been using.....barrels of.....(number).....(kind of dormant spray)

My dealer is:.....(Name).....(P.O.).....(State)

Name.....P.O.....State.....25

will not grow on other soils, but these are the types that will prove to be the most profitable.

The blackcap industry has been somewhat neglected on the Pacific Coast as a whole. Around Newberg there is quite an area of this berry being grown and in the Puyallup Valley they are being grown very successfully. It is a lover of deep, well-drained, moist loam and prefers a soil that is cool and abundantly supplied with humus. In the Inland Empire it thrives the best where the soil is somewhat shaded and kept cool by irrigation waters. The system that is used in the Payette Valley is subject to these conditions. We find the general requirements quite different to those necessary for the red raspberry, although the blackcap is by no means confined to this one type of soil. The river bottom soils of Western Oregon will all grow good blackcaps. It must be kept in mind that unless one can maintain a proper moisture supply, have good drainage and tillage that it is foolish to grow the blackcaps, as

they become small, hard and dry before anything can be done with them.

The blackberry offers an investment which should receive more attention. I have had cannerymen tell me repeatedly in Oregon that they could use five hundred acres of blackberries if they could procure them. The blackberry seems to thrive much better west of the Cascades than it does east. We find in the lower mainland of British Columbia that the blackberry has proved very profitable, and in the Puyallup Valley the Evergreen is one of the most profitable berries grown. In the Willamette Valley and in the Rogue River Valley blackberries can be grown to a wonderful degree of perfection and ease, not only including such types as the Kittatinny and Snider, but the brambles types and running types, such as the Mammoth and Evergreen, some of the valleys of the Inland Empire producing blackberries to very good advantage. It is fairly hardy and grows well in some of the higher valleys like North Powder. In Baker City I have

seen very luscious blackberries produced, and all over the Northwest more berries should be grown for home consumption. The blackberry is a great feeder and demands a fertile soil, one which will hold its moisture easily and one that is well drained. Ordinarily the clay loams are preferred for this berry. If the soil is somewhat lacking in plant food, stable manures or organic fertilizers should be applied as the plant will not grow successfully unless heavily fed.

The loganberry is found at the present time succeeding on soils ranging from the red hills down to the river bottoms. There is a difference of opinion as to which of these locations are the preferable. The writer has found splendid patches growing under all conditions. It is certain, however, that such river bottom soils as the Mission bottoms of the Willamette (this name is simply given to represent a type which extends along the Willamette and its tributaries) produce very heavy loganberry patches that are long lived. The loganberry should not be grown where the temperature drops down to the vicinity of zero or is apt to remain low for any time. Unless plants are protected from the cold they will not thrive. While there are portions of the Inland Empire along the Snake River that can grow the plants without protection, in the greater area of that region the soils and the atmospheric conditions are not of the best for this fruit. They do well in the coast regions and in the mountainous valleys of Western Washington and Oregon. Here the plant grows vigorously, is extremely productive and seems to find those conditions of soil and climate which produce maximum yields.

Great stories are often told of the production of gooseberries, and true it is that in Western Washington and Oregon this plant grows very luxuriantly. Very often within two years after setting the plants come into heavy bearing and give very satisfactory results. Some forms succeed better in the mountainous valleys of Western Oregon, owing to the prevalence of mildew nearer the Coast. The gooseberry likes cool, moist conditions. It will stand a northern exposure, more or less shade, a long growing season and cool weather. There are only certain types like the Red Jacket that seem to do well under the more or less arid conditions. What is true of the gooseberry is also true of the currant. Choose deep soils which have an abundant supply of plant food and moisture. A splendid income can be secured from both of these fruits. We could overdo the market if we all grew gooseberries and currants, nevertheless, more people should become interested in these fruits.

All in all, the Pacific Northwest is particularly fortunate in the ease with which small fruits can be grown. These industries should have had more careful study than they now receive. The possibility of by-products along these lines is almost unlimited.

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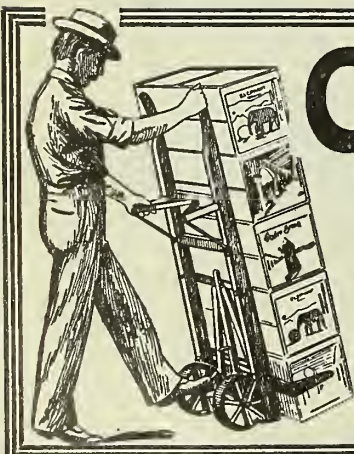
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PEACH GRADERS APPLE GRADERS
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CALIFORNIA IRON WORKS
RIVERSIDE, CALIFORNIA

Northwest Fruit Notes From Here and There

OREGON.

The Stanfield Fruitgrowers' Union at Stanfield, Ore., which harvested a crop of 3,000 boxes of apples last year, expects to ship 20,000 boxes of fruit this season. The union at Stanfield has engaged as manager M. A. Mohr, a well-known fruitgrower of Hood River, Ore.

The Sunnyclyffe orchard at Medford, Ore., recently changed hands, being purchased by Rupert Henry, a Chicago real estate man. The orchard was formerly owned by C. H. Chadwick. The property consists of 220 acres, 125 of which are in pears and apples, and the rest in grain and hay. It is located on the Talent irrigation ditch. The new owner will take charge of the property next spring.

It is announced that 300 orchardists are enrolled with the Oregon Growers' Co-opera-

tive Association in Jackson and Josephine Counties, comprising about one-half of the acreage in the fruit growing districts of those counties. The local members of the association include most of the largest orchards. Packing and warehouses have been located at Eagle Point, Grants Pass, Vorheis, Phoenix, Gold Hill and Davis. The value of the association's property in the Rogue River Valley is stated to be \$85,000. The largest warehouse is located at Medford, where 200 people are being employed during the heavy apple and pear packing season. The acreage of the association in fruit now comprises 30,000 acres and extends from Portland to Ashland.

Professor A. Kikuchi, one of the best known authorities on fruits in Japan, recently spent a week at the Southern Oregon Experiment Station visiting with Professor F. C. Reimer, who is making extensive experiments with

blight-resistant varieties of pears. Professor Kikuchi is the director of the experiment station at Yokohama, Japan, where he is conducting very extensive experiments with Japanese pears. While Professor Reimer was in Japan, Director Kikuchi gave him very material assistance in traveling with him to various parts of Japan, where the wild pears of that country are most abundant. Professor Kikuchi is looked upon as the greatest authority in Japan on Japanese pears. He is vitally interested in the extensive experiments with pears conducted at the Southern Oregon Experiment Station and will spend the week studying the work at this station.

Reports from the Hood River district are to the effect that unless the price of cull apples looks up in price that they will not be very profitable to the grower this year. The opening price was \$8 per ton, which was offered by the local vinegar company. Libby, McNeil & Libby, who have a large cannery at The Dalles, and bought heavily last year, are re-

Dried Buttermilk

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OLYMPIC Alfalfa Molasses Feed
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THE PACIFIC INTERNATIONAL LIVESTOCK EXPOSITION, Portland, Nov. 13-20, affords unequalled experience and encouragement to the livestock breeder and feeder. Look for the demonstration of OLYMPIC Feeds at this great show.

Livestock and Poultry Feeds

OLYMPIC Feeds mark the introduction of practical science in the manufacture and use of prepared feeds for livestock and poultry in the West.

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Laboratory tests of materials at every step in the making and practical field demonstrations soon prove the superior value of these feeds under every comparative condition.

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or send for complete information to—

The Portland Flouring Mills Company
PORTLAND, OREGON

The Puget Sound Flouring Mills Company
SEATTLE AND TACOMA, WASH.



ported to be holding off in buying apples for canning purposes. Prices last year for apples for canning ranged from \$16 to \$20 per ton.

Much alarm was felt by apple growers throughout Oregon during the month of October through the inability to get the crop harvested, due to bad weather. Continued rain caused pickers and packers to leave the orchards, and the wet weather made it difficult to get those who stayed to attempt to work. Where no provision was made for housing help the situation was particularly bad, and the schools were closed to allow students to assist in the work of gathering the crop.

It is generally accepted now that the Oregon prune crop in some sections of Oregon, Clarke County and Washington was injured by the wet weather to an extent ranging from 25 to 65 per cent. The exact extent of the damage, it is stated, will not be known until the final prune deliveries are made.

A general inspection of the orchards in the Roseburg district is being made under the auspices of the Extension Department of the Oregon Agricultural College. The work is being done by Professor Long, who recently took a position with the college as horticultural specialist, and is being taken up to determine the correct combative measures to be used for tree diseases that may exist in that section.

The Phez Company, one of the largest independent companies handling fruit products in the state, and the pioneer organization in placing on the big markets of the East the fruit juice drinks manufactured from loganberry and apple juice, announces that it has increased its capital stock to \$4,000,000. One million dollars of the preferred stock of the company has been placed on the market with a 7 per cent guarantee. The company has plants both in Oregon and Washington and ships its products to all parts of the world.

Oregon Malaga grapes grown at Grants Pass were marketed this year at good prices, the shipments bringing around \$3 a crate.

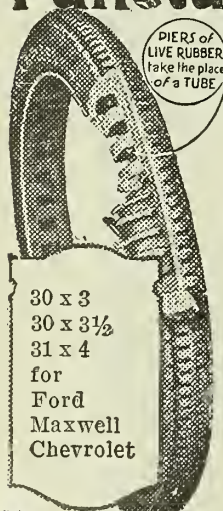
The Oregon Growers' Co-operative Association plans an expenditure of \$50,000 this year to advertise the fruit products it will handle. The largest part of this amount, it is stated, will be used in advertising the merits of the Oregon prune, which will be marketed under the new trade name of "Mistland."

A chemical factory, to be operated under the trade name of the San Francisco Chemical Company, is being established in Portland. The company, which, it is said, will be owned and controlled by the Stauffer International interests, has announced that its total investment in the new plant will be over \$1,000,000 when it is fully completed and in running order. It is to be erected in the Linnton district.

WASHINGTON.

Spokane, Whitman, Lincoln, Ferry, Stevens and Pend Oreille counties will ship about 1,500 cars of apples and probably 50 cars of pears and other fruit this year. The leaf roller pest in the vicinity of Otis Orchards, east of Spokane, made inroads on the commercial output of some of the leading orchards. Stevens county's production will exceed last year's considerably.

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Nothing can happen to a Dayton Airless Tire but wear. 8,000 miles is guaranteed. Users get from ten to twenty thousand miles of air-free, care-free service.

Let us demonstrate.

L. M. Mills, Manager
91 Eleventh Street
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Two Exceptional Hotels

Two of the most homelike hotels in Portland, located in the heart of the business, shopping and theatre districts.



All Oregon Electric Trains stop directly in front of

The Seward Hotel

The House of Cheer.



The Hotel Cornelius

The House of Welcome, is only two short blocks from

The Seward Hotel

Excellent Dining Room Service at Popular Prices is managed in connection with The Seward Hotel, the House of Cheer.

Rates, \$1.50 Up

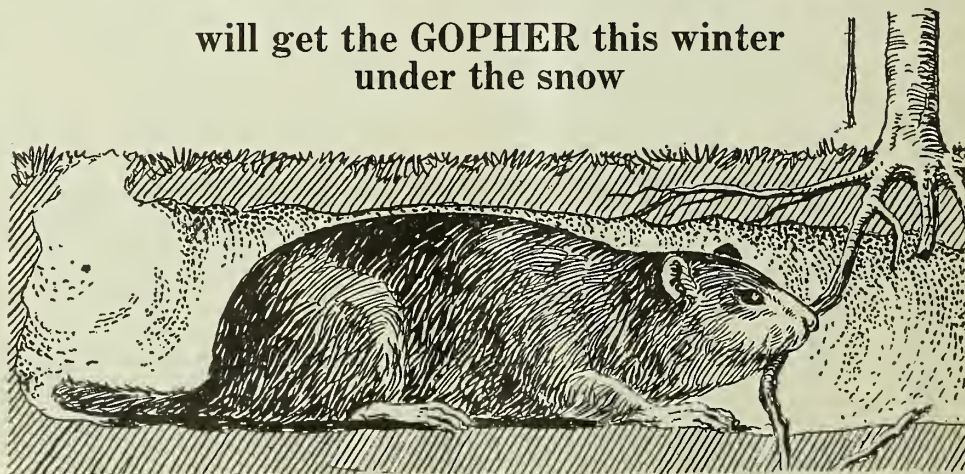
Our Brown Busses Meet All Trains.

W. C. CULBERTSON, Proprietor

What Are You Doing for Next Year's Apple Crop?

"Wood-Lark"

will get the GOPHER this winter under the snow



You cannot afford to have your trees thrown out of balance by loss of roots by Gophers. You know this affects their bearing, and sometimes even kills them.

Now is the time to plant "WOOD-LARK" well down in all gopher runs before snow flies.

If Your Dealer Hasn't Any, Write Us

Clarke-Woodward Drug Co.

PORTLAND, OREGON

The apple harvest has commenced in the Kettle River section, north of Spokane, good weather adding to the satisfaction of gathering the finest apple crop ever grown in this part of the upper Columbia Valley, as regards size, color and freedom from worms and scab. The yield is fully up to the average, some orchards producing much more than ever before. One grower expects to have 17,000 boxes. Some orchards that last year were seriously damaged with codling moth are virtually free from the pest this year.

At least 1,500 tons of Yakima cull apples will be converted into cider at the Lust & Walters plant, according to David Walters. The company has completely overhauled its plant and is preparing for a run of boiled cider. In former years it made fresh cider, but the Volstead act makes this impossible on a commercial basis. The company is paying \$6 a ton for cull apples, the lowest price since the cull apple market was developed. Last year the price went as high as \$20. The huge

plant of the Washington Evaporated Fruit Company is standing idle this year as there is no demand for dried apples at this time.

The first trade in Spokane Valley apples involving the 1920 crop embraced a lot of 50 cars and was handled by the Spokane Valley Growers' Union. Extra fancy Jonathans sold at \$2 to \$2.25 on the cars at Opportunity, which is about 25 cents under the opening price of last season. Delicious sold at \$2.50 to \$2.75 for extra fancy grades, which is 75 cents under the first prices of 1919, and extra fancy Winter Bananas are selling at \$2.25 to \$2.50 a box, which is about \$1 under the price a year ago.

The large addition to the plant of the Spokane Valley Growers' Union at Opportunity, adjoining the city, is almost completed and most of the mechanical appliances are in place. Much of this machinery has been designed especially for this plant, and work on its installation is being rushed in readiness

for the opening of the apple packing season. The plant has a capacity of 2,500 boxes per day of 10 hours, and requires 125 persons to keep it going at capacity.

A special car with 25 women apple packers arrived during October at Fairfield, 25 miles south of Spokane, direct from California, to pack the apple crop of the Commercial orchard, containing 1,000 acres. It is estimated the crop of this orchard will be around 100,000 boxes.

Growers of the Lewiston-Clarkston section are going back into peaches. It is estimated that 250 acres of peach trees will be set out there in 1921. Many growers grubbed out peach orchards a few years ago and developed their attention wholly to apples. There is now a marked disposition to return to peaches, especially varieties best adapted to canning.

That the land along the sides and foothills of Moscow mountains in the Spokane country



Facts!

You cannot deny them.

Motorists buy Zerolene because it is good lubricating oil; because it makes the car last longer.

More than half the motorists of the Pacific Coast states use Zerolene. Such approval is given only as a reward to a product of highest quality.

There is a Zerolene Correct Lubrication Chart for each make of car. Get one for your car at your dealer's or our nearest station. Use Zerolene for the Correct Lubrication of your automobile, truck or tractor.

STANDARD OIL COMPANY
(California)



The **BLASTER** says=

*"I use **GIANT**
It gets them out
cleaner"*

Professional blasters know explosives. They have tried all the different makes. Many of them say "Giant gets the stumps out cleaner." John Zurr of Santa Rosa, Cal., writes:

"From the beginning of the time I have been using powder for stump blasting and other agricultural work, I have found the powder made by The Giant Powder Co. to be the most satisfactory. Each certain percentage of Giant Powder is exactly what it is represented to be."

Tell your dealer you want the genuine Giant Farm Powders—Giant Stumping or Eureka Stumping. The Giant trademark on every box is your sure protection against imitations.

It will pay you to write today for our book, "Better Farming with Giant Farm Powders." It tells scores of money-saving ways of doing farm jobs—land clearing, ditching, tree planting, etc.

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"Everything for Blasting"

202 First National Bank Bldg., San Francisco

Branch Offices: Butte, Denver, Los Angeles, Portland, Salt Lake City, Seattle, Spokane.



STUMPING

EUREKA

is ideal for strawberries is the statement of L. A. Buswell of Viola, who has eight acres of ever-bearing strawberries, from which he has sold \$2,000 worth so far and the season will not end until cold weather. Mr. Buswell was selling 47 crates a week during the fall and supplies the towns of the Palouse country between Spokane and Lewiston. He is getting from \$4 to \$4.50 a crate.

Contrary to most apple shipping districts, figures recently compiled at Wenatchee show that a total of 500 more cars of apples were shipped from there up to October 15 this year than last year. This year, up to this date, 1,637 cars of apples had been shipped from Wenatchee while last year, on the same date, about 1,100 cars had been shipped. The highest shipment for any one day this year was 125 cars. The record shipment for Wenatchee in 24 hours is 250 cars.

Due to the hail storms which visit Wenatchee at times and injure the fruit, many of the apple growers carry hail insurance. This year most of these hail insurance policies expired at midnight September 30. At 9 o'clock, or three hours before the policies expired, a hail storm visited the valley and did some damage. In commenting on this fact the Wenatchee Advance says: "While the damage was very slight, yet a number of growers have been paid substantial sums for the losses incurred. Never before was a hail storm heard of at this late date in the season, but it is a lucky thing for the policy holders that it did not occur 12 hours later."

IDAHO.

The apple harvest is about completed in Lewiston Orchards and the Indian Cache ranch, northeast of Lewiston, Idaho. During the height of the season the daily shipments reached 10 carloads. Most of the early pack was loaded in cars for immediate shipment, although warehouses are prepared for later storage. There are 10 packing houses operating in Lewiston Orchards and several in the Clarkston district. The large new warehouse of the Indian Cache ranch is now ready for use, and a packing house is operated in connection with it. Inspector C. G. Andrus, who is overseeing outgoing shipments, says the quality of the fruit this year far surpasses that of last season. In addition to local growers' associations, the Earl Fruit Company is operating in the field this year again, and three branches of the Skookum Packers' Association have been formed in the Lewiston-

Clarkston district. One large grower is packing under the Chinook brand. Winter Bananas, Jonathans and Delicious are the early varieties being shipped, with Newtowns to follow.

What They Are Doing in California

Large plantings of small fruits are reported from California. In the vicinity of Mountain View, hundreds of acres of strawberries and raspberries are being set.

The Roseville Drying and Packing Company, which recently started up a large dehydrating plant at Roseville, has been handling a large tonnage of grapes of various varieties. The demand on the plant has been so great that it is being worked continuously day and night.

Seventeen hundred tons of prunes and muscat grapes were dried during the month at a new dehydrating plant opened this fall at Santa Rosa. Another dehydrating plant, which has been opened at Santa Rosa, has a capacity of 40 tons per day and expects to operate the year around.

The Yucaipa country, which is being rapidly developed as an apple-growing section in California, is giving promise of being one of the most important apple-growing sections on the Pacific Coast. The crop there this year is said to be especially fine and growers are expecting good prices. The latest methods have been adopted, and the district has an active association that is handling a large share of the crop.

Reports are to the effect that some of the grape growers in Yolo County will average \$600 worth of seedless raisins to the acre this fall.

California shipped 46,757 carloads of citrus fruits, valued at \$81,200,000, in the season just ended, according to the report of G. Harold Powell, general manager of the California Fruit Growers' Exchange. The report was given to the directors of that organization at their annual meeting recently.

Director Hecke of the State Department of Agriculture of California announces the appointment of G. Spencer Wice as inspector with headquarters at Los Angeles, where he



VIRGINIA GAMES

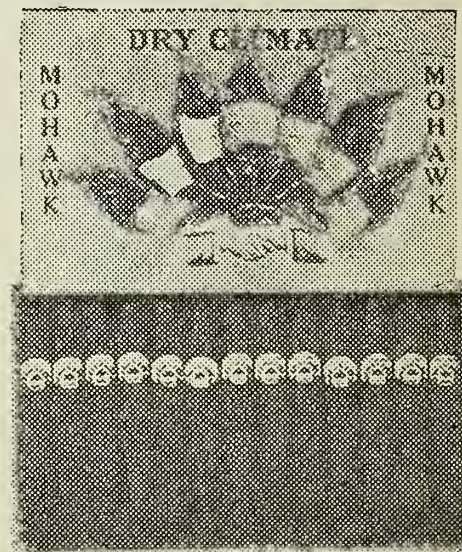
Fancy Black Breasted Red Exhibition Games; gamey fighters; make excellent gifts for your friends and children. Give out door pleasure.

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PLANS FOR POULTRY HOUSES
All Styles, 150 Illustrations. Also copy of "The Full Egg Basket." These will surely please you--send 25c.
Inland Poultry Journal, Dept. BF, Indianapolis, Ind.

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THE MISCIBLE OIL FOR DORMANT USE
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HOOD RIVER, OREGON

State Distributors of the "FRIEND" Sprayers

will be attached to the force of Field Entomologist D. B. Mackie. Mr. Wice is a graduate of the Iowa State College, and prior to this was with the Agricultural Extension Service of the C., B. & Q. Railway. He was also engaged in agricultural reclamation work in Maryland in the United States Civil Service. At present his duties will be confined to work on the walnut codling moth in Southern counties.

Prune and apricot growers, non-members of the California Prune and Apricot Growers, Inc., the growers' state-wide co-operative marketing association, who stood to lose hundreds of thousands of dollars on their 1920 crops through their inability to find immediate buyers for their fruit, will be permitted to sell their 1920 crops through the association under terms of an arrangement that has recently been made. The association will take care of the prunes and apricots these growers deliver by forming a second pool and making a first payment to them equal to the collateral value of their fruits in the warehouses of the association. Growers taking advantage of the association's offer will sign the regular crop contract and become members of the association. H. G. Coykendall, general manager of the association, said that the association would fully protect its present members by not selling a pound of the prunes or apricots received under the new arrangement until it had made complete settlement with its old members for all the fruit they delivered this fall. Hundreds of outside growers were left stranded last August when the association refused to handle crops for non-members after it had named the price it would pay its members for their fruit. The independent packers, it is said, finding these outside growers at their mercy, have been declining to buy their fruit except at prices several cents under the existing market quotations.

California As A Boxed Apple State

Few people, says the Monthly Bulletin of the California State Department of Agriculture, realize the importance of California as a boxed apple state. Of the total number of cars of boxed apples shipped in 1919, California ranked second, the State of Washington being the only one to exceed it. According to figures recently given by the United States Bureau of Markets, California was followed by the number of cars shipped in 1919 by Oregon, Idaho and Colorado in the order named. These figures show that California in 1919 shipped 4147 cars, and of that number 539 cars were unloaded in New York City, and that 76 per cent of California apples were unloaded at the ten principal market centers of the United States. It would seem, therefore, that New York is by far the most important outlet for Western apples.

That California will continue to be a very important factor in the shipment of boxed apples is indicated by the statistics covering the non-bearing acreage of the state. Figures compiled by the California Development Board show that there were 690,835 non-bearing trees in San Bernardino County alone in 1919, which is more than the total number of bearing and non-bearing trees in Santa Cruz County for the same year. These figures, it is stated, may be taken as indicative of the non-bearing acreage in other Southern California districts.

Bits About Fruit, Fruitmen and Fruit Growers

According to a cablegram of recent date from the American Agricultural Trade Commissioner in London, cheap varieties of apples from European countries are now glutting the English market, and the supply will last until early November. The supply of American apples was also reported as plentiful. The total quantity reported landed and afloat for the English market on October 11 was reported at 125,000 barrels.

A statement recently issued by C. B. Stewart, Jr., business manager of the Florida Citrus Exchange, is to the effect that the coming season's crop of citrus fruits in Florida will be somewhat less than last year's yield. Mr. Stewart says reports reaching the Tampa offices of the Exchange from the various citrus sections of the state indicate the orange crop now showing on the trees to be somewhat in excess of that of last year, but the apparent shortage of grapefruit will more than offset this, if reports are accurate. He says it is extremely difficult to make a close estimate while fruit still is green on the trees; and that even the closest of present estimates must be subject to revision later.

A report furnished to the Bureau of Markets in regard to the wiring of fruit packages for export is of particular interest to the Northwest shippers. The report is as follows: "That effective for all shipments leav-

ing point of origin on and after July 15, 1920, apples and other green or citrus fruits in boxes must be strapped or wired; also, that all dried fruits, canned goods, including canned meats and goods packed in jars or bottles, shall be charged 10 cents per 100 pounds in addition to the individual rates of the line over which the commodity is shipped, unless containers are strapped or wired."

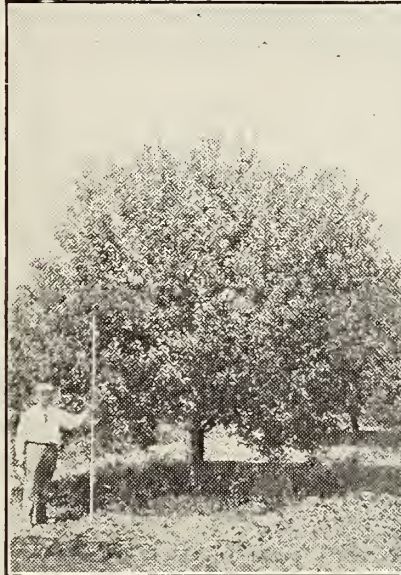
The American Fruit Growers, Inc., has recently made public the figures for its first thirteen months of operation, ending June 30, 1920. Its gross sales were \$34,487,000, and surplus earnings, after payment of all interest charges, Federal taxes for 1919, and preferred stock dividends, were \$694,227, equal to approximately \$13 per share on the outstanding common stock.

During that period the company handled 31,280 cars of fruits and vegetables, made up as follows: Potatoes, 6,120 cars; citrus fruits,

5,262 cars; cantaloupes, 4,748 cars; apples, 2,863 cars; other, 12,187 cars.

The company maintains extensive jobbing offices in New York, Pittsburgh, Chicago and St. Louis, and car-lot sales offices in the other principal markets of the country. In addition to its marketing operations, the company owns and operates more than 8,000 acres of apple and peach orchards, citrus groves and vegetable farms located in the best commercial districts and representing an investment of \$5,600,000. The company has outstanding \$5,202,800, 7 per cent, cumulative convertible preferred stock, 53,581 shares of common stock of no par value, and \$1,000,000, 7 per cent, convertible notes due 1922-26.

The company's fifth regular quarterly dividend on its preferred stock was payable October 20. The American Fruit Growers operates in every section of the United States and is concerned with all branches of the fruit and vegetable industry from growing the crops



The tree at the right was planted in a spade-dug hole in the same orchard and at the same time as the one above.



The tree at the left was planted in dynamited hole. Cultivation methods did not differ from those given to trees planted without using dynamite.

Plant with Dynamite— Trees bear a year sooner

EXPLODING a very small charge of dynamite in the ground when a tree is to be planted not only makes the planting easier but the sub-soil is so shattered that roots grow faster and greater stores of plant-food are made available.

America's leading orchardists and nurserymen who have planted millions of trees with



say that their trees bear fruit a year (frequently two years) earlier than those planted in spade-dug holes; first year losses are practically stopped; fungus and nematode are completely destroyed; fruit is finer in quality and size. Plant *all* your trees with dynamite and be sure to tell your dealer "Du Pont Dynamite."

Write for details on tree planting described in our book "Developing Logged-off Lands." It is yours for the asking.

E. I. du Pont de Nemours & Co., Inc.

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"In Every Respect"

says the Good Judge



You get more genuine chewing satisfaction from the Real Tobacco Chew than you ever got from the ordinary kind.

The good tobacco taste lasts so long—a small chew of this class of tobacco lasts much longer than a big chew of the old kind. That's why it costs less to use.

Any man who has used both kinds will tell you that.

Put up in two styles

W-B CUT is a long fine-cut tobacco

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Stoves Once Were Nailed to the Floor

Not so the modern oil heater. Filled with PEARL OIL it gives instant heat *anywhere*, at any time. It sees a continuous round of service — bedroom — dining room — kitchen — parlor — and bedroom again in the evening. PEARL OIL burns without smoke or odor. Economical. Sold in bulk by dealers everywhere

Order by name — PEARL OIL.

STANDARD OIL COMPANY
(California)

to their transportation and final distribution. Their facilities are available for growers in any part of the country, who are thus enabled to market their crops where the demand is greatest.

Cannery Notes

Three thousand barrels of Maraschino cherries were put up this year from Oregon fruit by the Libby, McNeil & Libby plant in The Dalles, Ore.

Another big fruit and vegetable cannery, the seventh owned by the A. Rupert Company, has just been completed at McMinnville, Ore., at a cost of \$50,000. This gives the concern a capacity of 750,000 cases during the season, an output that means an expenditure of about \$2,250,000 for farm and orchard produce. During the past eight months \$150,000 has been the various Rupert plants.

That American canned foods are popular in Great Britain is shown by a letter from Edgar A. Foley, Commissioner of the United States Department of Agriculture in London, to E. G. Montgomery, in charge of the Foreign Markets Service. It says in part:

"American canned fruits have earned an enviable reputation for themselves in Great Britain. In all the grocery and fruit shops one can see the well-known United States brands that have long since become staples in the American household.

"So wide has been this distribution that in five stores within a radius of two blocks from Cross & Blackwell's factory I counted four stores carrying United States canned foods and pickles. I maintain that it is some accomplishment to put American pickles and canned goods on sale opposite the Cross & Blackwell works. American peaches, pears, apricots and plums have all had a good sale and wide distribution, and to within the last few months have brought top prices.

"Large stores of canned foods were held here in Great Britain at the end of last season, but as the demand was good, local merchants purchased heavy stores for this season at good prices. They forgot to figure on these canteen stores held mostly in France, with the result that when speculators and others bought these canteen stocks and brought them to England there was a large over-supply. It is estimated that the present supply is about 3,000,000 cases above the normal supply.

"The result has, of course, been an enormous drop in all prices, and the bankruptcy of many firms for large amounts. There is now no recognized price for any goods, and any quantities of peaches, pears or apricots can be purchased for 50 per cent of the importing price.

"An exception to this rule is, however, the Hawaiian pineapple crop. In spite of adverse conditions this market remains firm, and the product is in demand.

"It comes directly in competition with a great deal of colonial pine, but the high quality of the pack gives it a place of its own. We can well be proud of this pack. The cubes are even and the slices are likewise even and well cut. The colonials are far behind in pack. Their idea is to cut the pine in any shape to get it into the can. The result is a very poor pack and a resultant poor price.

"There is practically no American jam on the market at the present time."

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Milton Nursery Company
MILTON, OREGON

FOR THEIR 1919 CATALOG
FULL LINE OF NURSERY STOCK.

"Genuineness and Quality"



10 Cents

WORTH OF COMMON ORDINARY KEROSENE or Coal Oil will keep this lamp in operation for 30 HOURS and will produce

300 CANDLE POWER

No Wicks to Trim
No Smoke
No Smell

of the purest, whitest and best light known to science. Nothing to wear out or get out of order. Simple. Safe. Absolute satisfaction guaranteed. Send for catalog showing lamps for every purpose; also special introductory offer and agency proposition. Write today.

KNIGHT LIGHT & SODA FOUNTAIN COMPANY, Dept. 409 Chicago

Whip Grafting

Roots and scions for whip grafting should be secured in the fall of the year and stored. The work of grafting, says the United States Bureau of Plant Pathology, may then be done during the winter months. When the operation has been performed, the grafts are packed away in moss, sawdust or sand in a cool cellar to remain until spring. It is important that the place of storage should be cool, else the grafts may start into growth and be ruined, or heating and rotting may occur. If the temperature is kept low—not above 40 degrees F.—there will be no growth except callusing and the knitting together of stock and scion.

In ordinary propagation by means of whip grafts, the scion is cut with about three buds, and the stock is nearly as long as the scion. The graft is so planted as to bring the union of stock and scion not very far below the surface of the ground; but where the trees are required to be especially hardy in order to stand severe winters, and the roots used are not known to be so hardy as the plants from which the scions have been cut, a different plan is adopted. The scions are cut much longer and the roots may be cut shorter, and the graft is planted so deep as to cause roots to issue from the lower end of the scion. When taken up to be set in the orchard, the original root may be removed entirely, leaving nothing but the scion and the roots which have been put forth from it.

Decorating the Ranch Home

By N. M. Collart.

A long looked for transition is today taking place in the character of the farm home. In a general way this may be illustrated by the picture of the buildings on the prosperous farm as they used to be and as they are coming to be.

You have noticed many times doubtless the splendid barns and sheds to house efficient cultivating and reaping machinery when passing some farm and have turned in wonder, as I have, to look at the modest and frequently insignificant home for the farmer's family. There was a time when it was proverbial for a farmer to work from "can't see" in the morning until "can't see" at night. Under such conditions the farmer had little ambition or desire to improve his home.

With the shortening of the farmer's working hours, due to improved machinery, quicker transportation and better prices, folks from the country not only have more time for home life, but can intermingle more freely with neighbors, both in the country and city, bringing about an interchange of ideas with resultant desire for the better things of the house.

This desire finds expression not only in the desire for better furniture, articles of comfort or luxury and a

J. & H. GOODWIN, LTD.

Apple Exporters

Headquarters in United States
60 State Street
Boston, Massachusetts

*The Largest Handlers of American Apples
in English Markets*

You can send your apples direct from the United States into the industrial centers of England. The same organization (J. & H. Goodwin, Ltd., throughout) which ships your fruit from the U. S. A., sells and distributes in London, Liverpool, Manchester and Hull, and on the European Continent.

This means quick handling, considerable economies and the fruit being sold in the freshest possible condition, which means greater returns.

For dependable export information write or wire us at 60 State St., Boston, Mass. or 97 Warren St., New York City.

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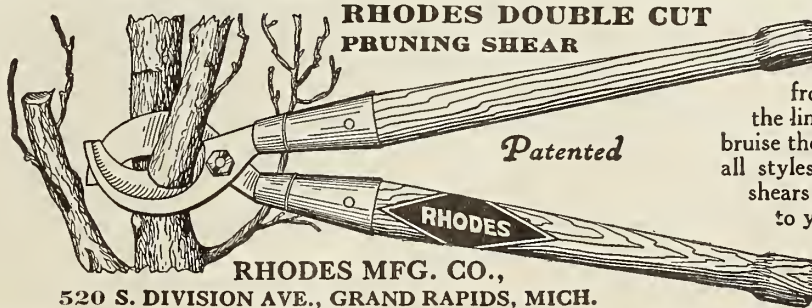
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Everything Known in Music

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THE only pruner made that cuts from both sides of the limb and does not bruise the bark. Made in all styles and sizes. All shears delivered free to your door.

Write for circular and prices.

**BEST SERVICE-
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**PERFECTION IN
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SIMPSON & DOELLER CO.
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E. SHELLEY MORGAN
NORTHWESTERN MANAGER

WE CARRY—AND CAN SHIP IN 24
HOURS—STOCK LABELS FOR PEARS,
APPLES, CHERRIES & STRAWBERRIES.

big touring car, but a general brightening up and improvement in the home itself.

Mother and the girls receive their regular magazines and are taking inventory of their general surroundings with the result that the Department of Decoration of the Sherwin-Williams Co. finds it quite as common to receive inquiries for country homes as for the city. There is no reason in the world why the country home should not have just the same features to make it a source of pride and comfort.

Woman is, generally speaking, more sensitive to color than the man of the same class. This is evidenced by the many little uses of color employed by every housewife. Color represents moods to a woman and the most stolid nature responds to the cheer of soft appropriate wall colors which set off the beauty of her curtains, furniture and rugs.

Color is best appreciated in bright bold touches used in small areas such as the flower in the stencil pattern near the ceiling. The curtains should be in clean tones, soft shades when solid color, bright when figured. The tones of the rug should never be "noisy." The wall color, which occupies by far the biggest portion seen by the eye, should be in neutral shades such as warm grays, soft tans and gray-greens or gray-blues.

The decorative scheme employed supplies the atmosphere in which you live your home life, and whether this life be contented with a harmonious arrangement of colors or full of jangling discords in surroundings in cheap and garrish effects is fortunately well within your power to secure.

Protect the Orchard Machinery

Many a piece of farm machinery is broken in use, at a busy, critical period, because the part has become weakened by rust.

Nowadays, when a machine breaks, it is not only the cost of replacement to be considered, but the machine may be out of service for several days or weeks because the dealer's stock of parts is low and completely out on some items.

And it isn't the dealer's fault, either, in most cases. He has orders in for short stock parts, but ordering is one thing and getting orders filled is something else, as all machinery dealers and their customers know to their sorrow.

All farm machinery should be kept painted. Reduce breakage to the minimum. Parts will break often enough when machines are handled with the utmost care, but just now, when replacements are so expensive and so difficult to get promptly, regardless of price, the least the farmer can do is guard against this unnecessary weakening of essential equipment by allowing rust to set in on it.

Fortunately paint isn't scarce. It takes very little time to apply it and

the cost is nothing compared to the loss of several days' use of an important machine at a critical period in planting, cultivating or harvesting time.

ATTENTION!

Boys and Girls

I want to hear from every boy and girl who would be willing to devote just about one hour's spare time. I will reward them for their services with choice of the following articles:

Premo Cameras
Raincoats
Rain Hats
Flashlights
Beautiful pencil boxes with assortment of pencils and pens
Fancy stationery, and many other beautiful articles.

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For full particulars enter your name and address on the coupon below and tell me what you would like to have. I will tell you how easy it is to get it.

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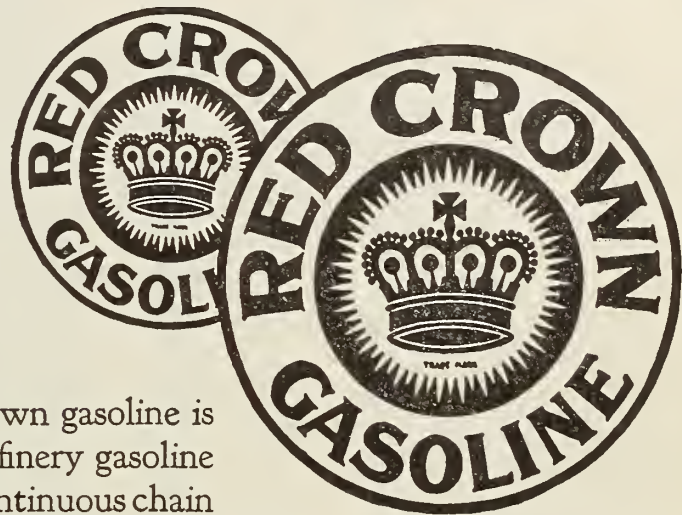
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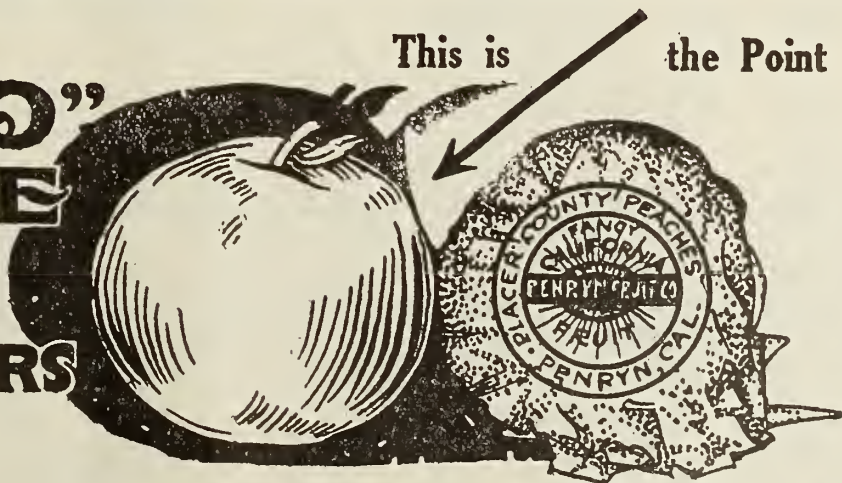


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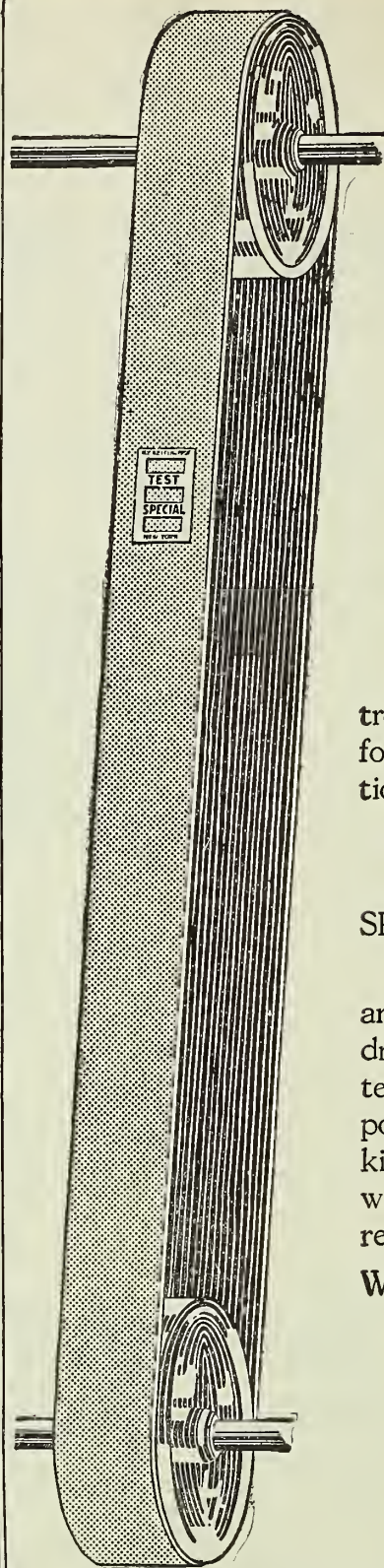
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